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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/661,945

09/12/2003

Neil Birkett

9931-042

8389

20575 7590 06/28/2007  
MARGER JOHNSON & MCCOLLOM, P.C.  
210 SW MORRISON STREET, SUITE 400  
PORTLAND, OR 97204

EXAMINER

VLAHOS, SOPHIA

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

06/28/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/661,945

Applicant(s)

BIRKETT, NEIL

Examiner

SOPHIA VLAHOS

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-8, 10-13 and 20-30 is/are pending in the application.
- 4a) Of the above claim(s) 1, 9 and 14-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2, 10, 20-22, 26-27, 30 is/are rejected.
- 7) ☒ Claim(s) 3-8, 11-13, 23-25, 28 and 29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Allowable Subject Matter*

1. The indicated allowability of claims 2 and 10 is withdrawn in view of the newly discovered reference(s) to Birkett et. al., (U.S. 6,977,976) and Constantinidis et. al., (U.S. 6,792,254). Rejections based on the newly cited reference(s) follow.

### *Specification*

2. The abstract (9/12/2003) of the disclosure is objected to because it exceeds 150 words. Correction is required. See MPEP § 608.01(b).

### *Drawings*

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. With respect to claims 20 and 26 Therefore, the "detector to generate a detect signal by detecting a **difference** between the I and Q signals" of claims 20 and 26 must be shown or the feature(s) canceled from the claim(s). Fig. 5 shows detector 46 (details of which are shown in Fig. 6) and Digital Engine 50 (details of which are shown in Fig. 9) where detector 46 detects the I and Q signals and the engine generates the difference signal responsive to the digital detect signal and a reference signal new matter should be entered. Method claim 26 corresponds to claim 20, and mentions "detecting a difference between I and Q signals..." which is not shown in the Figures.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

4. Claims 2-8, 27-30 (claims 27-30 of the claim set received on 4/13/2007) are objected to because of the following informalities:

Claim 2, recites: "i. detecting respective I and Q output signals received from respective I and Q variable gain amplifiers (VGAs) associated with said specified AGC stage;" and then steps ii. , iii. , iv. , and v. It should be clarified in claim 2, that the detecting step comprises steps ii. through v.

Art Unit: 2611

Dependent claims 2-8 are also objected to since they at least contain the limitations of claim 2.

Claim 27 depends on claim 25 (but it should depend on method claim 26).

Claims 28-30 have similar issues regarding their dependency and should be appropriately corrected.<sup>1</sup>

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 20, 26, 28-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Birkett et. al., (U.S. 6,977,976).

With respect to claim 26, Birkett et. al., disclose: generating a detect signal by detecting a difference between I and Q signals at respective outputs of I and Q variable gain amplifiers of a plurality of serially connected automatic gain control stages (see Fig. 2, AGC stages 29<sub>1</sub> through 29<sub>n</sub>, Fig. 6 is the detector (controller of Fig. 4a), see column 9, lines 14-26, 37-43, and the detect signal is signal d and it detects a difference between the detected I/Q signals and a reference signal); converting the detect signal to a digital detect signal (see column 9, lines 55-59); generating a control signal to control

the I and Q variable gain amplifiers responsive to the digital detect signal (Fig 4a, the gain estimate of Fig. 6 is used control the I and Q VGAs see column 9, lines 48-51) ; and adjusting the I and Q variable gain amplifiers responsive to the control signal.

With respect to claim 28, Birkett et. al., disclose: rectifying the I and Q filtered signals from alternating to direct current (see Fig. 6, rectifiers 62I and 62Q where the I and Q signals have passed through complex poled filters prior to being supplied to the VGAs , see Fig. 2, the filters preceding each of the AGC stages).

With respect to claim 29, Birkett et. al., disclose: adding the rectified I and Q signals (Fig. 6, summer 63).

With respect to claim 30, Birket et. al., disclose: low-pass filtering the added I and Q signals (see integrator 64 of Fig.6, column 9, lines 37-39).

With respect to claim 20, claim 20 is rejected based on a rationale similar to the one used to reject claim 26 above, since claim 20 recites specific components used to perform the steps of method claim 26.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

Art Unit: 2611

the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2, 10, 22-25 are rejected under 35 U.S.C. 103(a) as being obvious over Birkett et. al., (U.S. 6,977,976) in view of Mohindra (7,110,734).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing

Art Unit: 2611

that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

With respect to claim 2, as best understood, Birkett et. al., disclose:

(a) at a specified stage in an I/Q baseband strip containing multiple automatic gain control (AGC) stages (Fig. 2, see AGC stages 29<sub>1</sub> through 29<sub>n</sub>, column 6, lines 47-54), each of said AGC stages having locally generated control signals associated therewith (Fig 4a embodiment of AGC stages, column 7, lines 53-54 and Fig. 6 (the controller of Fig. 4a), column 9, lines 14-16): i. detecting respective I and Q output signals received from respective I and Q variable gain amplifiers (VGAs) associated with said specified AGC stage (see Fig. 6 detector, receiving I and Q signals) iii. Rectifying said respective I and Q signals (Fig. 6 rectifiers 62I and 62Q); iv. adding said respective I and Q filtered output signals (Fig. 6, adder 63); v. passing said added I and Q filtered output signal through a low pass filter (LPF) (Fig. 6, integrator 64 that functions as a low pass filter (see column 9, lines 37-39); vi. digitizing said detected I and Q signals (see column 9, lines 55-59, see digital nature of the signals in and out of block 65 of Fig. 6); and vii. adjusting with said associated control signal said respective I and Q VGAs for differences between said detected I and Q output signals and a reference signal (Fig. 6 see Fig. 6, comparator 65 compares the "detected" signal, and "e" AGC Level Set, see column 9, lines 39-43, and see that the gain estimate is fed back to control the I and Q VGAs as shown in Fig. 4a); and (b) repeating (a) through each AGC stage (Fig 4a and Fig. 6 are understood to be applicable to all stages of the circuit shown in Fig. 2).



Art Unit: 2611

Birkett et. al., do not expressly teach: step ii. passing said respective I and Q signals through respective high pass filters (HPFs); and Birkett et. al., do not expressly teach that the adder is an operational amplifier.

In the same field of endeavor (zero-IF receiver) Mohindra disclose: passing I and Q signals through respective high pass filters (HPFs) (see Fig. 1, HPFs 24 and 25 filtering I and Q signals respectively, column 2, lines 3-5). At the time of the invention, it would have been obvious to a person skilled in the art to modify the system of Birkett et. al., based on the teachings of Mohindra to pass I and Q signals through respective high pass filters (HPFs) to remove (residual) DC errors.

With respect to the limitation: adding said respective I and Q filtered output signals in an operational amplifier, the combination of Birkett et. al. and Mohindra, disclose summing the I and Q filtered signals, and with respect to the specific nature of the summer (i.e. op-amp) operational amplifiers and their configurations (i.e. op-amp adders) are well known in the art. Therefore it would have been obvious to a person ordinary skilled in the art at the time of the invention to use an op-amp to perform addition, and use use few /cheap/widely available components to perform addition (op-amp).

Apparatus claim 10 is rejected based on a rationale similar to the one used to reject method claim 2 above since claim 10 recites specific components used to implement the steps of method claim 2.

With respect to claims 22-25, claims 22-25 are rejected based on a rationale similar to the one used to reject claim 2 above.

9. Claims 21 is rejected under 35 U.S.C. 103(a) as being obvious over Birkett et. al., (U.S. 6,977,976) in view of Sanders et. al., (U.S. 6,754,487).

With respect to claim 21, Birkett et. al., do not expressly disclose:

I and Q buffers to buffer the I and Q signals respectively

Sanders et. al., disclose storing an I Q data stream (column 7, lines 54-55). At the time of the invention, it would have been obvious to a person skilled in the art to modify the system of Birkett et. al., so that the I and Q signals are stored (in buffers or storage elements) to be available for further processing. With respect to the I and Q buffers, not expressly disclosed by Sanders et. al., at the time of the invention, it would have been obvious to a person ordinary skilled in the art to use either separate storage (buffers) or common storage (buffer) for the I and Q signals, depending on the amount of available space / power requirements / components used to implement the receiver of Birkett et. al.,

10. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Constantinidis et. al.,(U.S. 6,792,254) in view of Dilling et. al.,(U.S. 6,163,685).

With respect to claim 20, Constantinidis et. al., disclose: I and Q variable gain amplifiers to generate I and Q signals, respectively (see Fig. 1, AGC1 and AGC2 , see column 3, lines 4-5); a detector to generate a detect signal by detecting a difference

Art Unit: 2611

between the I and Q signals (Fig. inside PR block, GEN, column 3, lines 9-14, column 5, lines 3-7,  $V(s1)-V(s2)$ ); an engine to generate a control signal responsive to the detect signal (the engine is inside the PR block, the LPF, column 5, lines 6-10); where the I and Q VGAs operate responsive to the control signal (see Fig. 1, where the SP signal see column 3, lines 15-17, 47-51).

The difference between Constantinidis et. al and claim 20, is that Constantinidis et. al do not disclose: an ADC to convert the detect signal to a digital detect signal; and the control signal is generated responsive to the digital detect signal and a reference signal.

In the same field of endeavor (controlling gain of a receiver), Dilling et. al., disclose: a digital detect signal (see Fig.3 details of element 20 of Fig. 1, elements up to counter 48, see column 5, lines 43-48); and a control signal generated responsive to the digital detect signal and a reference signal (Fig. 3, elements 50 and 54, see column 5, lines 49-62).

Therefore at the time of the invention, based on the teachings of Dilling et. al, (who uses digitally controlled VGAs and digital control signals, generated by element 20), it would have been obvious to a person ordinary skilled in the art to modify Constantinidis et. al., so that correction device (of Fig. 1) is implemented digitally (including the VGAs), therefore the detect signal has to be converted to a digital form and signal the correct digital up/down signals to the digitally controlled VGAs), since digital domain processing allows for high speed processing and has low power consumption requirements.

11. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Constantinidis et. al.,(U.S. 6,792,254) in view of Dilling et. al.,(U.S. 6,163,685) and Kingsbury et. al., (U.S. 6,308,155).

With respect to claim 26, claim 26 is rejected based on a rationale similar to the one used to reject method claim 20, and with respect to the claimed limitation "plurality of serially connected automatic gain control stages" not expressly taught by neither Constantinidis et. al. nor Dilling et. al., Kingsbury et. al., disclose: cascading AGC stages (column 6, lines 55-67), and it would have been obvious to a person ordinary skilled in the art to use a plurality of serially cascaded AGC stages in the system of Constantinidis et. al., to provide better gain normalization and onset enhancement (column 6, lines 57-67).

12. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Constantinidis et. al.,(U.S. 6,792,254) in view of Dilling et. al.,(U.S. 6,163,685) and Sanders et. al., (U.S. 6,754,487).

With respect to claim 21, neither Constantinidis et. al. nor Dilling et. al. disclose: I and Q buffers to buffer the I and Q signals respectively

Sanders et. al., disclose storing an I Q data stream (column 7, lines 54-55). At the time of the invention, it would have been obvious to a person ordinary skilled in the art to modify the system of Constantinidis et. al. and Dilling et. al. so that the I and Q signals are stored (in buffers or storage elements) to be available for further

Art Unit: 2611

processing. With respect to the I and Q buffers, not expressly disclosed by Sanders et. al., at the time of the invention, it would have been obvious to a person skilled in the art to use either separate storage (buffers) or common storage (buffer) for the I and Q signals, depending on the amount of available space / power requirements / components used to implement the receiver of Constantinidis et. al.,

13. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Constantinidis et. al., (U.S. 6,792,254) in view of Dilling et. al., (U.S. 6,163,685) and Mohindra (7,110,734).

With respect to claim 22, neither Constantinidis et. al., nor Dilling et. al., expressly teach: where the detector includes: I and Q high pass filters to generate I and Q filtered signals by removing direct current offsets from the I and Q outputs.

In the same field of endeavor, Mohindra discloses: I and Q high pass filters to generate I and Q filtered signals by removing direct current offsets from the I and Q outputs (see Fig. 1, filters 24 and 25, column 2, lines 3-5).

At the time of the invention, it would have been obvious to a person skilled in the art to modify the system of Constantinidis et. al., and Dilling et. al., based on the teachings of Mohindra to use HPFs to remove Dc offsets from I and Q signals, and the placement of the HPF (as being part of the detector PR) would have been obvious to a person ordinary skilled in the art at the time of the invention, so that I and Q signals without dc offsets are supplied to detect differences between the I and Q signals.

Art Unit: 2611

14. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Constantinidis et. al.,(U.S. 6,792,254) in view of Dilling et. al.,(U.S. 6,163,685), Kingsbury et. al., (U.S. 6,308,155), and Mohindra (7,110,734).

With respect to claim 27, claim 27 is rejected based on a rationale similar to the one used to reject claim 22 above.

#### ***Allowable Subject Matter***

15. Claims 3-8, 11-13, 23-25, 28-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is 571 272 5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SV

6/18/2007

  
MOHAMMED GHAYOUR  
SUPERVISORY PATENT EXAMINER